TELCO FORGE

Why Don’t We Have Access-Agnostic Telecoms?

A TelcoForge Leaders’ Meeting Report

Jan 2025

CONTENTS

INTRODUCTION

TelcoForge is holding monthly meetings mainly for C-level and SVP-level professionals from as diverse an array of stakeholders as possible. These meetings take place under Chatham House Rules to enable senior professionals to speak frankly. However, we capture the anonymised ideas and outcomes for the wider industry to digest and act upon.

For the inaugural discussion in January, we asked the participants *"What would happen if telecom networks became truly access-agnostic?"*

The rationale is as follows:

Standards development for 6G includes provision for supporting a "network of networks", which would enable seamless coordination of services across cellular, Wi-Fi and non-terrestrial networks at least; in some visions it also includes NB-IoT, mesh networking through Sidelink, and more.

This is not a new concept. Around the turn of the millennium there were conferences and serious discussions around "Fixed-Mobile Convergence" and the 3G UMTS standard includes "Universal" in its acronym for good reason.

At the same time, the appeal from an end-user perspective is obvious. If it were possible for your device to access whichever network allows the best connection at any given place and time, it would vastly diminish the number of dropped calls. It would mean no more cumbersome logging on to Wi-Fi networks for the first time. It would improve coverage, service performance and resilience at a stroke.

So why hasn't this convergence taken place yet?

What does that tell us about the nature of the industry, its structures, drivers and flaws?

And what does that tell us about the chances of a "network of networks" materialising, regardless of the work ongoing in for a such as 3GPP?

EXECUTIVE SUMMARY

TelcoForge's inaugural Leaders' Meeting convened over a dozen senior telecom executives to discuss the implications of achieving truly access-agnostic networks - where services operate seamlessly across cellular, Wi-Fi, and non-terrestrial networks. While the aim is not to specifically advocate for this outcome, understanding why a long-discussed concept has not been delivered can reveal truths about the functioning or disfunction of the industry.

There are already a variety of services which demonstrate elements of access-agnosticism in practice. However, these solutions are often driven by non-telecom players, raising concerns about traditional operators' role in the evolving ecosystem.

While much of the public conversation in telecoms focuses on technology, it is not the primary roadblock, though improvements in handover, session continuity, security, and authentication would likely be necessary for large-scale adoption. Instead, business concerns are much more significant.

- **Financial Constraints:** Operators are burdened with high debt and low returns, making potentially disruptive investments unattractive.
- **Market Saturation:** Consumer bases are largely static, prompting a shift towards enterprise services where telcos face competition from hyperscalers.
- **Structural Inertia:** Many operators maintain siloed business models, resisting convergence. Vendors, meanwhile, are reluctant to embrace openness due to business risks.

The telecom sector struggles with business model innovation, limiting its ability to capitalise on emerging opportunities such as IoT, platform services, and intelligent infrastructure. Service delivery beyond connectivity demands operational and structural changes, but also coordination with regulators and policymakers to let it happen.

Proposals include:

1. **Government and Industry Collaboration** – Policymakers should actively incentivise innovation through targeted funding and regulatory flexibility.
2. **Embracing Multi-Sided Business Models** – Operators must explore new monetisation strategies beyond traditional device-and-SIM approaches.
3. **Regulatory Modernisation** – Regulators should align frameworks with the evolving digital ecosystem, ensuring policies support industry-wide experimentation and scalability, and the wider ecosystem would be well advised to actively support them.

The telecom industry stands at an inflection point. Access-agnostic networks are just one sample case where progress hinges on overcoming entrenched business models, regulatory inertia, and investment hesitancy. The coming years will determine whether telecom operators can lead this transformation or remain connectivity providers in an increasingly platform-driven world.

ACCESS-AGNOSTIC CONCEPTS

During discussions, it became clear that there were a few different meanings of “access-agnostic telecoms” depending on who was speaking and in what context. They can be summarised as:

- Making a **single telecoms provider**’s core network operate seamlessly between fixed and mobile access points. While this might deliver a simplified structure, there was little appetite expressed for this due to the complexity and cost of changing established networks. “The idea of re-architecting your whole network down really at the network element level, which is what you need to be able to do... I just don't see why you would do that with these very complex networks.”

- Making an **experience for end-users** which is independent of the access technology or network being used. Consumers prioritise reliability and seamless service, largely indifferent to underlying technologies. "For end users, it’s all about quality of service—they don’t care if it’s cellular, Wi-Fi, or satellite as long as it works," said one participant.

Image courtesy of EU/Lukasz Kobus

For the latter definition, two different methods were mooted.

The first is taking handover management and session continuity to a greater extreme: “We just need to make sure that we can hand over between one and the other and maintain an IP session above all of the different networks.” We could think of this as effectively ‘roaming on steroids.’

The other proposal is less about the access network at all. By opening up APIs, unifying service experiences can be done differently. “What we're doing is passing that information in a different way. Ultimately, it's not a fully open access network, but I think it’s a compromise for the industry to be able to start to do things like running autonomous networks.”

Participants pointed out that in any situation there would likely need to be some form of coordinator. Whether or not that would be a telecoms provider at all is an open question.

ACCESS-AGNOSTIC SERVICES

"If we take a long-term view, the degree of 'neutrality' has increased over time."

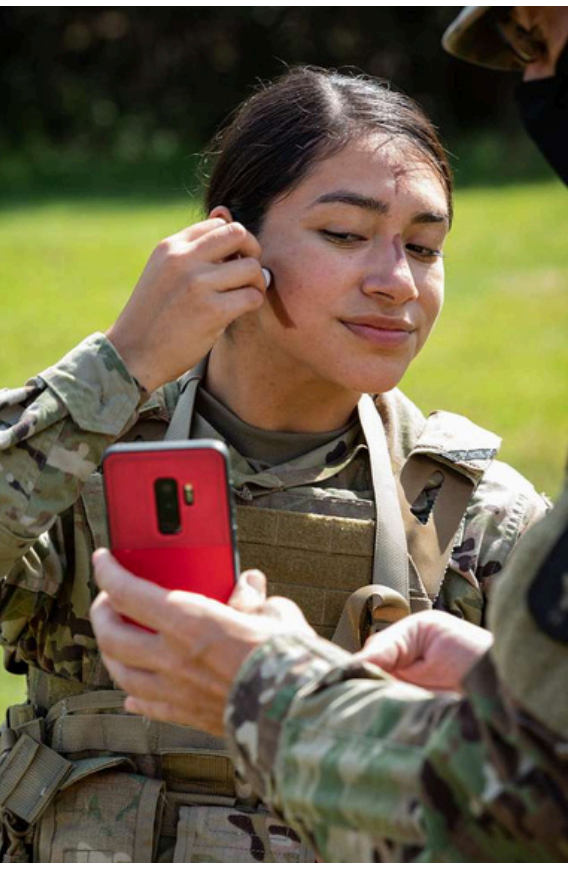
Participants pointed out a variety of services and methods which are **already being employed** to deliver capabilities which are, or can be, agnostic to which network is providing them.

- **Applications like WhatsApp,** which can be used globally regardless of access technology or device.

- **eSIM services** which can be used either within a country or across borders to provide continuity of service where an individual provider's network is absent.

Notably, in both cases ultimate control of the end-user's experience lies with stakeholders other than the network operator or service provider.

"If I look at the most converged service I can get at the moment, it's an iPhone, which will offer me cellular access, satellite access and the iPhone will go and do the same thing on Wi-Fi if I've got a password for that. That's offered by Apple, not by a mobile operator."



While some people might see this as suggesting access-agnosticism is dangerous to established business models, it also highlights that there is **demand from both consumers and enterprises** to a degree which has effectively disrupted the incumbents in this space already.

There is another emerging source of demand. Defence and critical communications markets are increasingly looking to move away from dedicated networks such as TETRA and running over the top of existing commercial networks. However, "In defence scenarios, interoperability across networks isn't just a luxury; it's mission-critical," one expert noted.

Indeed, last year **NATO engaged in an exercise** called DiBEx, the Digital Backbone Experiment. "Really the crux of that experiment was to utilize a NATO core... basically, use NATO as an MVNO." Using a variety of RAN set-ups and RAN sharing, different countries' troops were able to authenticate back to their home network and roam onto the NATO core.

"Technology wise, I don't think it was anything revolutionary, but... I think we saw value in that for sure, and we're looking to expand on that."

TECHNOLOGY

As per the quote on the previous page, what became abundantly clear is that **technology is not the primary obstacle to progress.**

There may be some aspects which would need improving to deliver access-agnostic services at scale. Participants highlighted the need to strengthen some technical elements to manage a greater propensity for services to shift between networks and different access types, notably:

- Handover capabilities
- Session continuity
- Security
- Authentication

Operators pointed out that they are currently focussing on **simplifying their networks**. As a result, any changes would ideally be implemented without adding significant further complexity.

These considerations pale in comparison to the other elements, however...

> "How do we get to a point where the existing operators see that there is some advantage to them in moving to a different kind of world and therefore act in a way to bring it about?"

BUSINESS PRESSURES

Structurally, the telecoms industry has considerable pressures upon it which were highlighted during the meeting. These are not unique to the topic at hand but need to be considered as underlying facts about the market.

Firstly, financial pressures are considerable, which affects their appetite to take risks which might disrupt their current income streams. Participants flagged up the relatively low return on investment in telecoms compared even to other CapEx-intensive industries.

"Carriers are already **burdened with massive debt**. They're not going to invest in something that disrupts their revenue streams unless the case is crystal clear."

Meanwhile, in most countries the base of consumers is saturated. It might be possible to compete for market share, but typically there is only so much of that to go around too before regulators step in.

As a result, many telecoms providers are aiming to attract enterprise customers as a means of finding revenue growth. However, that means competing against existing enterprise IT players, hyperscalers and others in this market, which is an intimidating prospect.

Secondly, the history of many of the larger markets is often an impediment.

"We've got siloed operators. Mobile operators run mobile networks with their own mobile customers. Fixed operators run fixed networks with their own fixed customers. They both separately build them and neither of them want to give up the customers... so they all tend to hang on to their own networks and resist the idea of converging with others."

While individuals can be found who would argue that this could be a good idea, there is also a coordination problem; **nobody wants to be the first** player to enable, for example, seamless roaming onto their assets assuming every other challenge was eliminated. That would give a clear coverage advantage to competitors. As a result, it would require all the players in a market to support access-agnosticism and to move at the same time.

Thirdly, even where there is an appetite for experimentation among the service providers, "The **vendors have absolutely no incentive** to do it... the resistance to open that up is very, very strong from the industry."

There is a concern that disruption of the status quo will see established business models crumble; and while this may seem inevitable one way or another, network vendors have their parallel to the 'legacy problem' facing operators. Investments in R&D, engaging in the pre-standards and standardisation processes, testing and certification, and then working through operators' mean that large and small companies alike face huge overheads which are only offset by bringing technologies to market at scale. If operators change their business models in ways which threaten that pipeline or suggest a reduction in demand, it will naturally face opposition.

REGULATORY QUESTIONS

Regulation was widely addressed. Part of the problem with this topic, however, is the nationally-based nature of regulations which often aim at very different outcomes, and which have often been developed over decades in response to specific pressures rather than being designed as an overarching system.

As a result, participants were able to refer to country-specific regulatory approaches or mention attitudes which are reasonably emblematic of many markets. However, regulations tend to be very far from standardised or harmonised... which is part of the problem. **Market fragmentation,** particularly in Europe, stymies unified approaches.

"**Europe is a miserable place for innovation**; the market is so fragmented that it's hard to coordinate any large-scale efforts," observed a stakeholder.

Another noted that "What is "access-agnostic" varies by country due to competition and regulatory policies, and not all network technologies are treated the same. **We don't have technology-neutral policies**, so there are problems with creating technology-neutral markets."

However, there is a more fundamental element within the regulation. In many countries, the regulator was set up for two main reasons: to manage spectrum allocation and to maintain competition in the market. That competition element includes **preventing collusion,** and any telecoms providers wanting to coordinate in changing some very fundamental elements of their business might well risk falling foul of collusion accusations.

Changing this approach requires a change in policy at the top level nationally, from regulation focussed on preserving competition to something which is **more pro-innovation** in a coordinated way. For example, the complexity of today's telecoms market is often overlooked and reduced to the dynamics between 'telcos' and 'network vendors.' While that might have been a useful way to think about the market thirty years ago, today it is an obstacle.

"It isn't just about the mobile operators; it's about the digital ecosystem. And if we look at access-agnostic arrangements, some have been led by mobile operators but there are many other examples, such as eSIM, which was notably driven by Apple. So we are going to have a range of players who push for new business opportunities. But sometimes the regulator won't let you try it. Sometimes it takes a completely fresh pair of eyes, and the Apple approach was a fresh pair of eyes."

As one Western participant noted, "What the Chinese do particularly well is they **create policy, they invite people in, and they orchestrate across players** to create a load of innovation work. And I think that is where [we] can learn... But I think organising and orchestrating that is difficult. If we can get a handle on that, I think we can do a lot more with the industry, and I think we can get innovation pervasive across the industry a lot more effectively."

Regulators would need to consider some very real questions if the industry were to move towards an access-agnostic approach, however. For example:

"If you're looking at things like legal intercept of voice calls, where's that going to sit in this access-agnostic world? The answer is probably above all the networks now, because the voice call actually happens through a WhatsApp type interface, not through a provision of IP packets across an underlying bearer network."

There have been rumblings from the telecoms industry for years about the different ways in which national service providers have been regulated and held accountable compared to international digital players. The example above highlights the different mindset and technology approach which would be needed to regulate an access-agnostic environment properly.

Regulators would also need to think about how questions of **data protection and privacy** would work, while considering how coverage requirements linked to spectrum licenses might need to be adapted.

As a result, we should also include not just the willingness of regulators to adapt their own approaches as a limiting factor, but also their **capacity and preparedness** to do so. Some countries' regulators are experimenting with sandboxes to enable more of a 'move fast and break things' approach to market experimentation but this is still limited in scope and varies by country.

BUSINESS MODELS & BUSINESS MINDSET

More than the business background and more than the regulatory environment, the single biggest focus for frustration fell on the difficulties creating new business models beyond the mainstream 'device and a SIM card' approach. While to some degree the business environment, technology development and regulation are external to the telcos, this is one area where there is much less room for excuses.

> "Look at airplanes, right? I'm flying long haul and with the on-board coverage it's a very simple service, you pay for connectivity. What about all the inflight services you could start to offer? It doesn't happen."

While areas such as this might be considered quite niche services compared to a full B2C service nationwide, cumulatively they add up. Said another,

"I really worry about the IoT space for telecom because **I just don't see the business models**."

IoT is a very striking area where data volume and data value are very different from B2C. While the incremental price a consumer is willing to pay for 5G over 4G may be small or non-existent, a sensor sending the correct data reliably every 10 minutes may be very valuable to a business. However, understanding the value inherent in the communication is very different from what most service providers are accustomed to with all-you-can-eat consumer offerings. While some service providers are making good business in supporting other industries, many are not and "IoT" can often be the gateway to enterprise services.

"I think what's probably equally important is to look at areas where telecom operators have tried to get into businesses, but then they did not succeed and had to backtrack. If you take, for example, the datacentre space, telcos got into it 15 years ago, and most of them got out of it, right? At least in the US, maybe other markets as well. Similarly in the cloud space, they got into it through multiple models - through partnerships, through open source - and then they got out again. Then came the edge cloud, similar story, and the AI business, similar story."

What underlies this struggle? A full exploration of this was far beyond the bounds of one discussion, but some important points were raised.

"**We're not very good at multi-sided business models**. I think that, for me, is the thing," one participant commented. "We talk about network monetisation, we talk about APIs that we can monetise and enable these new services, but... there isn't a willingness to actually have this kind of truly developed ecosystem. We try to do it, but the industry doesn't operate in a way that they truly feel comfortable with multi-sided business models. And that is something that I've never understood because I think so many opportunities have just passed us by."

Another participant highlighted the strengths that operators have had traditionally in their core business of connectivity.

"What they haven't, in most cases, done very well is converging service on top of this connectivity layer, like over the top type applications. In some cases, they're good at initiating that, but then when it goes to scale, they're not the ones that are winning that business. Either the business case is not there, or the dynamics are not there, or the policies or regulation are not there."

Risk aversion over the long term must come into the story as well. If we tie back the point above about telcos getting into businesses and then out again to the financial pressures they face, it is easy to see how executives facing pressure from a board for results would struggle to invest over the long term with other players when the return on that investment is slow to come.

Testing a market and then withdrawing from it, essentially because there is something else to point to as the core business, is a very different scenario from companies exclusively focused on, for example, building datacentres.

INFRASTRUCTURE AGNOSTICISM

Increasingly telecoms providers are experiencing a form of convergence at the network level, with several providers' services running over **shared passive and active infrastructure**. While this is not directly pertinent to delivering access-agnostic telecoms services to end users, it underlines that the paradigm that operated in 2G and 3G eras – that of multiple integrated service providers competing based on who could offer the best network – is eroding quickly. This is a move within the industry towards an infrastructure-agnosticism which might encourage mindset changes from the silos described above.

Malaysia's shared 5G network was highlighted as an example of this new approach, although there are many others, including Finland's shared rural 4G network.

Meanwhile, in the USA there is certainly pressure to take a different approach not just to telecoms network infrastructure but a **cross-sectoral infrastructure push** where deployment is regionally coordinated across transportation, utilities and telecoms. In this environment it would typically be local government at city level acting as the coordinating function.

"We're now to the point where you'll see multiple buildouts occur, and then that will become a reference architecture that can be duplicated."

The Chinese experience, once again, was referred to by contrast.

"They're much more aggressive when it comes to a cloud evolution and sharing infrastructure. And I don't think it's a technical problem. All the technology is there. It's just the willingness."

While physical infrastructure sharing is increasingly a phenomenon at scale, not least due to the legal separation of infrastructure and service companies in many countries, it is not in itself necessarily a solution to some of the other challenges facing telecoms providers. One participant highlighted the experience in Malaysia with a single 5G network:

"Malaysia is probably one of few countries sharing 5G, which removes the risk. So the telcos don't really plan to invest on the infrastructure. But **I've yet to see telcos innovating for it** or working out how to combine this with Wi-Fi services indoors."

Moreover, the evolution towards infrastructure agnosticism is unlikely to be straightforward or necessarily one-directional. There will be trade-offs to make at the level of industry structure.

As one participant commented, "Single networks have their problems too. Are you swapping competition policies for government control for a good reason? Spectrum efficiency for innovation? Investment certainty with lost resilience?"

OPPORTUNITIES

While the discussion inevitably focussed on the challenges that would be faced in delivering a functional ‘network of networks’ in whatever shape, there were still reasons for optimism that something closer to it than at present might be delivered.

Firstly, there is reason to think that the next generation will be **more technically flexible** than 4G or 5G. While we know this is not the decisive factor it will certainly make the business cases stack up more easily. As one participant commented,

“With 5G, we also had all the different bolt-on radios, whether it be RedCap, or a whole initiative to do XR, or all the IoT options that we had. It was a very unsatisfactory way of doing things and rolling out technology, so it was very confusing to the end users. One of the big discussions in 6G is the idea of versatile devices. So you come out on Day One with the ability to configure a RedCap device, an XR device, any MBB device. It should be enormously more flexible. And, speaking personally, I see a lot of hope for that because it will be hopefully a much more flexible system that allows us to instantiate different radio instances much more on the fly.

“You marry that to AI/ML and suddenly **maybe, just maybe, you get back to differentiation possibilities** where you've got a different radio and a different technology working when you're in the subway versus when you're walking down the street.”

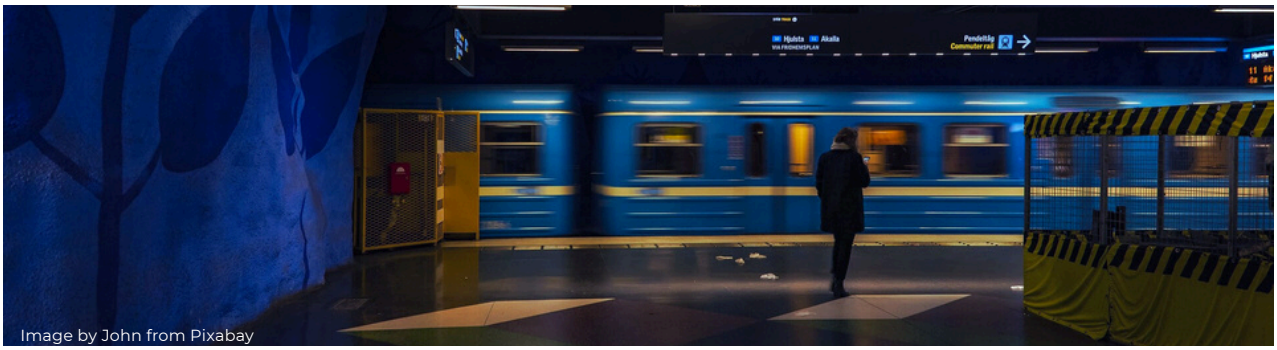


Image by John from Pixabay

Meanwhile, the combination of access-agnostic services running over shared infrastructure could be a heady combination, if achievable at scale. It would be the culmination of a separation between the physical network and services.

““If smart XR goggles had precise navigation and more though access to ultra-wide bands, densified, just imagine all the additional devices and technologies that they could actually deploy in the real world. But all that requires technology on the sidewalk. And nobody has the economics to pay for it unless it's a unified approach.”

RECOMMENDATIONS

The meeting was not designed to advocate particularly for access-agnosticism, but rather to gain an insight into the complexities of the telecoms industry and how business, technology, operations and policy interrelate. Nevertheless, the discussion did create some potential action points or recommendations.

INCENTIVISING INNOVATION

Firstly, governments should actively decide on the critical outcomes they want and act to incentivise those outcomes.

"We need government to take a more active role, **not controlling, but coordinating and incentivising** collaboration," suggested one contributor, who went on to explain:

"So if for example O-RAN is something that really matters, then giving individual firms money to go and roll out their O-RAN strategy can be one way of doing it. But I would also say we should find a way to incentivise the Nokias, the Ericssons, and whoever else to collaborate more and drive an open set of standards or whatever it is. But it needs to come down to some sort of basic extrinsic motivator. You can't just say "Do it for the good of the country"."

The idea of governments encouraging innovation and collaboration is not only for the vendor community, however. While many of the major telcos have units involved in research or standards development, typically the proportion of spending – and therefore influence in the rest of the company – is very small.

"It is very rare that you will see leading operators at the front end of the technology discussion, orchestrating innovation or being heavily coordinated with research. That is just something that doesn't work very well. And that really needs to change if you want pioneering discussions to happen."

MULTI-SIDED BUSINESS MODELS

The difficulties the industry experiences in forming and maintaining multi-sided business models is a crucial problem. It is foundational not only to enabling access-agnostic services but to adopting platform business models such as for APIs; to many enterprise services; or even to playing a useful role in intelligent shared infrastructure.

While the causes of these difficulties lie outside the scope of this document, it is clearly something which needs further consideration. Obstacles are likely to be a combination of operational, skills availability, financial and, ultimately, managing risk.

"If we believe that this is not a pie-in-the-sky type of effort, I think that would be beneficial to get the feedback from different operators just on what they think this looks like. At the end of the day the operators still need to make money. They're struggling. And so **we have to think about a business model** that enables them to continue to generate revenue in this type of environment."

REGULATORY & POLICY PREPAREDNESS

While there are many obstacles, regulation at a national and international level is an ongoing challenge. For example, the variation in spectrum allocations, costs and rules from nation to nation was noted as being problematic for an industry that thrives on scalable solutions.

Regulatory preparedness to enable different business models needs to be considered, for example to enable operators to coordinate on **creating new approaches to the market** even as they compete for shares within those new approaches.

In many countries the role of the regulator is not so much to act in this function as to limit problematic behaviour in existing business models. At a high level, we should question whether the regulator's role and purpose needs adapting for the realities of the late 2020s and 2030s.

While organisations such as the GSMA do offer regulatory capacity-building capabilities, further investment into upskilling regulators and support for their alignment on issues where there are commonalities internationally may be rewarding in the longer term.

ACKNOWLEDGEMENTS

The TelcoForge team would like to thank the senior executives for their time and insights making this report possible.

We look forward to many other constructive insights.

Leaders' Meetings take place monthly on an invitation-only basis. Executives on the invitation list have no obligation to attend but may propose an alternate participant if they are unable to join.

Please contact TelcoForge below if you would like to:

- *Nominate a colleague or be nominated to* ***join the invitation list*** *for monthly Leaders' Meetings.*
- *Explore ways to* ***associate your brand*** *with these reports or other TelcoForge content.*

CONTACT

Alex Lawrence
Managing Director

alex.lawrence@telcoforge.com
www.telcoforge.com
+44 7713 086721